



3rd class

Software Engineering

هندسة البرمجيات

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Chapter 1: An Introduction to Software Engineering

1.7 The Evolving Role of Software:

Today, software takes on a dual role. It is a product and, at the same time, the vehicle for delivering a product.

1.As a product: it delivers the computing potential embodied by computer hardware or, more broadly, a network of computers that are accessible by local hardware. Whether it resides within a cellular phone or operates inside a mainframe computer, software is information transformer (producing, managing, acquiring, modifying, displaying, or transmitting) information that can be as simple as a single bit or as complex as a multimedia presentation.

2.As the vehicle used to deliver the product: software acts as the basis for the:

a. control of the computer (operating systems.)

b. The communication of information (networks).

c. The creation and control of other programs (software tools and environments).(The role of computer software has undergone significant change over a time span of little more than 50 years. Dramatic improvements in hardware performance ,profound changes in computing architectures, vast increases in memory and storage capacity, and a wide variety of exotic input and output options have all precipitated more sophisticated and complex computer-based systems. Sophistication and

Complexity can produce dazzling results when a system succeeds, but they can also pose huge problems for those who must build complex systems .

The lone programmer of an earlier era has been replaced by a team of software specialists, each focusing on one part of the technology required to deliver a complex application.

1.8 Software: A crisis on the horizon

Whether we call it a software crisis or affliction, the term alludes to a set of problems that are encountered in the development of computer software. The problems are not limited to software that “doesn’t function properly”. Rather, the affliction encompasses problems associated with how we develop software, how we support a growing volume of existing software, and how we can expect to keep pace with a growing demand for more software.

1.9 The Attributes of Good Software

As well as the service which they provide software products have a number of other associated attributes which reflect the quality of that software.

These attributes are not directly concerned with what the software does, rather they reflect its behavior which it is executing and the structure and organization of the source program and associated documentation. Examples of these attributes (some time called non-functional attributes) are the software’s response time to use query and the understandability of the program code. The specific set of attributes which you might expect from a software system obviously depends on its application. Therefore a banking system must be secure, an interactive game must be responsive, a telephone switching system must be reliable, etc. these can be generated in the following attributes:

1- **Maintainability**: software should be written in such a way that it may evolve to meet the changing needs of customer. This is critical attribute because software change is an inevitable

2- **Dependability**: software dependability has a range of characteristics, including reliability, security and safety. Dependable software should not cause physical or economic damage in the event of system failure.

3- **efficiency**: software should not make wasteful use of system resources, such as memory and processor cycles. Therefore efficiency includes responsiveness, processing time, memory utilization etc...

4. **Usability**: software must be usable, without under effort by the type of user for whom it is designed. This means that it should have an appropriate user interface and adequate documentation.

1.10 The Goals of Software Engineering

- Readability
- Correctness
- Reliability
- Reusability
- Extensibility
- Flexibility
- Efficiency

